

The Role of Institutions in Mitigating Risks in Rice Farming: A Case Study in Salokaraja Village, South Sulawesi

We Ati Mega Daeng Malebbi^{1,*}, Mahyuddin² and Syahriadi Kadir³

¹Agribusiness Study Program, Graduate School, Hasanuddin University, Indonesia; ²Department of Socio-Economic Agriculture, Faculty of Agriculture, Hasanuddin University, Indonesia; ³Department of Socio-Economic Animal Husbandry, Faculty of Animal Husbandry, Hasanuddin University, Indonesia

*Corresponding author's e-mail: weatimega@gmail.com

The rice farming subsector is a primary livelihood for people living in rural areas, particularly in the Soppeng Regency, which is known as one of the rice granaries in Indonesia. Nevertheless, rice farming faces various risks that can lead to a decline in production scale, one of which is the role of institutions that also influence the risks associated with rice farming. In light of this background, this study focuses on analyzing the role of institutions in mitigating rice farming risks. The research method employed is qualitative. The data sources consist of primary data collected through interviews and observations with key informants aligned with the research objectives. The results of the study indicate that the role of institutions in risk mitigation includes developing training and mentoring programs, providing technical guidance, assisting in the selection of superior varieties, supplying subsidized fertilizers, providing market information, and advocating for farmers' rights. Financial institutions such as agricultural cooperatives are located at a considerable distance, making them less accessible to farmers. Therefore, there is a need to establish agricultural cooperatives, as they can enhance farmers' productivity by assisting with capital needs, distributing subsidized fertilizers, and channeling farmers' harvests.

Keywords: Agriculture sector, production technology, farmers cooperatives, agricultural financing, farmers behavior.

INTRODUCTION

Indonesia is known as an agrarian country, with most of its population engaged in agriculture. As an agrarian nation, Indonesia possesses extensive agricultural lands as well as a diverse and abundant array of natural resources. Agriculture plays a crucial role in meeting basic needs and enhancing the social sector, economy, and trade (Setyadi, 2017).

The agricultural sector, particularly the food sub-sector such as rice farming, serves as a livelihood for people living in rural areas. However, in practice, rice farming is subject to various risks that can lead to reduced production, with some being difficult to control. Fluctuations in yield characterize agricultural ventures; in other words, this field involves considerable risk. Compared to other types of businesses, farmers in this sector find it challenging to predict outcomes with certainty (Wadu *et al.*, 2019). However, according to Ruttan and Hayami (1984), it is not only farmers' behavior that serves as a determining factor in mitigating agricultural

business risks. One of the influencing factors is institutional factors, which play a role in empowering farmers, particularly in the use of production technologies, to enable farmers to maximize production opportunities. In the context of rice cultivation, agricultural institutions can be practically identified as Village Unit Cooperatives, farmer cooperatives, farmer groups, extension centers, and other organizations such as banks, government agencies, and others. The purpose of these institutions is to facilitate technology transfer, agricultural financing and capital provision, institutional transfer of agricultural production, and marketing of agricultural products.

MATERIALS AND METHODS

This study used a qualitative approach with a case study methodology. It involved researchers examining a specific phenomenon (case) at a particular point in time and within a particular activity (program, event, process, institution, or

Malebbi, W.A.M.D., Mahyuddin and S. Kadir. 2025. Institutional role in rice farming risk mitigation (case study in Salokaraja village, Lalabata district, Soppeng Regency, South Sulawesi province). *Journal of Global Innovations in Agricultural Sciences* 13:1155-1164.

[Received 7 Jul 2024; Accepted 30 Aug 2024; Published 21 Jun 2025]



[Attribution 4.0 International \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/)

social group) and utilized various data collection methods about the phenomenon. The research covered a defined period and detailed information collection phases. Case studies are intensive investigations using multiple sources of evidence (qualitative, quantitative, or both) about an entity that is spatially and temporally bounded (Butsi, 2019). Case studies also investigate systems that evolve over time and in response to circumstances through detailed data collection and the integration of various rich information sources. This study focused on a specific subject and examined it as a case study. The case study data were available from all parties involved. The data for this study were compiled from various sources. The unit of case analysis in this study was risk reduction in rice farming.

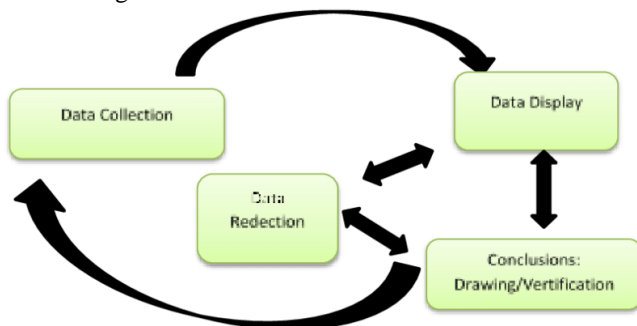


Figure 1. Qualitative research method.

Theoretical framework: Institutional Economics analyzes economic behavior with the assumption that institutions are not the same as organizations. Institutions are broader than organizations. The economic behaviors that occur, whether behavior that maximizes profits or behavior that does not maximize profits, are caused by institutional factors, both formal and informal. For example, economic behavior will be greatly influenced by applicable rules, regulations, laws, conventions, trends, or culture. In this research, institutionally the institutions involved in risk mitigation include the agricultural service, agricultural extension workers, farmer groups, and financial institutions.

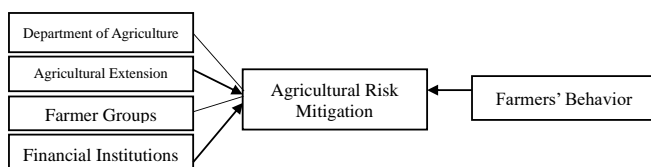


Figure 2. Theoretical Framework.

Institutional context

The role of the Department of agriculture in risk mitigation: The Department of Agriculture plays a crucial role in risk mitigation within the agricultural sector. Risk mitigation involves efforts to reduce or eliminate risks or hazards in agricultural production. The Department of Agriculture can

assist farmers in reducing risks by providing technical assistance, guidance, and financial support. The following are some of the roles of the Department of Agriculture in risk mitigation:

1. **Providing technical guidance:** The Department of Agriculture can offer technical guidance to farmers to improve productivity and efficiency in agricultural production.
2. **Assisting in the selection of superior varieties:** The Department of Agriculture is expected to help farmers determine rice varieties that are more resistant to diseases and extreme weather conditions.
3. **Providing market information:** The Department of Agriculture can provide market information regarding the demand and price of rice. By understanding market information, farmers can make informed decisions when selling their harvest and reduce price risks.
4. **Assisting in environmental Risk Mitigation:** The Department of Agriculture can help farmers reduce environmental risks that may affect agricultural production, such as drought or flooding.

The role of agricultural extension agents in risk mitigation:

An agricultural extension agent is an individual who actively engages in the communication of information with the intent to assist and provide ideas and input, thereby facilitating informed decision-making. The role of agricultural extension agents is crucial in achieving the vision of the Ministry of Agriculture, which is to develop competent and character-driven human resources in agriculture. Below are several roles that extension agents play in the risk mitigation of rice farming:

1. **Providing education on appropriate agricultural techniques:** Agricultural extension agents can offer farmers education and technical guidance on proper agricultural practices. These include selecting rice varieties that are resistant to diseases and extreme weather, using appropriate fertilizers and pesticides, managing effective irrigation, and implementing weed control techniques.
2. **Informing about government policies related to agriculture:** Extension agents provide information on government policies that impact agricultural practices and regulations, ensuring that farmers are aware of current guidelines and opportunities.
3. **Providing market information:** Agricultural extension agents can provide market information regarding rice prices and demand, helping farmers make informed decisions about their production and sales strategies.
4. **Developing training programs:** Extension agents can develop training programs to assist farmers in managing risks associated with production losses, such as adverse weather conditions, pests and diseases, or price fluctuations.



5. **Advocating for farmers' rights:** Agricultural extension agents can help farmers advocate for their rights, including access to water and land resources and protection from the negative impacts of climate change.

The role of cooperatives in risk mitigation: The role of financial institutions in risk mitigation is crucial, particularly in the context of financial risk mitigation. Through credit and financing facilities, insurance services, risk management services, the provision of market information, and the development of training and mentoring programs, banking institutions can assist farmers in reducing financial and operational risks while enhancing the productivity and efficiency of their farming operations. Below are some of the critical roles that cooperatives play in risk mitigation:

1. **Providing credit and financing facilities:** Banks can offer credit and financing facilities to farmers to help them address financial challenges related to rice farming.
2. **Providing insurance services:** Banks can offer insurance services to protect farmers from losses due to unexpected weather changes, pest and disease outbreaks, or fire risks.
3. **Providing risk management services:** Banks can offer risk management services to assist farmers in managing financial and operational risks.
4. **Providing market information:** Banks are expected to disseminate market information to farmers regarding the price and demand for rice, thereby aiding farmers in making better decisions about the timing of harvest and the sale of their produce.
5. Developing Training and Mentoring Programs.

The role of farmer groups in risk mitigation: A farmer group refers to a collective of two or more farmers who maintain interactive relationships and have clear objectives, structure, and patterns of relationships among their members. These relationships encompass roles, norms, and work processes that are intrinsically interconnected. The following are some of the critical roles of farmer groups in risk mitigation:

1. **Collaboration and knowledge sharing:** Farmer groups can facilitate collaboration among farmers by sharing their experiences and knowledge in managing rice farming.
2. **Improved access to resources:** Farmer groups can assist farmers in enhancing their access to the resources needed to manage rice farming, such as seeds, fertilizers, pesticides, and agricultural equipment.
3. **Institutional development:** Farmer groups can support farmers in building institutions that can aid in managing operational risks.
4. **Enhancement of skills and knowledge:** Farmer groups can help farmers improve their skills and knowledge in managing rice farming.
5. **Increased bargaining power:** Farmer groups can aid farmers in enhancing their bargaining power in the market.

Risk perception and coping mechanisms

Farmers' behavior in production risk mitigation: Based on observations, farmers can assess potential risks from various aspects of production, which can be measured by land preparation, seed selection, fertilizer usage, and finally, maintenance stages:

1. **Land preparation:** This step is crucial in determining the success of agriculture, especially rice cultivation. The type of land used in farming activities, as stated by the interviewee, Mr. Anto, is gardens. Suitable land for rice cultivation is highlands with loose, humus-rich soil. Therefore, before planting, soil processing activities such as plowing or turning the soil should be conducted to make it looser. Based on interviews conducted with farmers, it is noted that knowing land selection allows them to understand that planting requires careful preparation. In rice cultivation, efforts should be made to avoid using chemical materials. Farmers also understand the importance of choosing land with a reliable water supply to meet their needs. The findings of this research are consistent with the study conducted by [Suharyanto et al. \(2015\)](#) who found a significant effect on rice production from factors such as land area, seeds, and both organic and non-organic fertilizers. It can be concluded that farmers have met the production risk mitigation requirements in terms of land preparation.
2. **Seed selection:** The choice of seeds with good quality significantly influences production risks. The seeds used by the farmers are primary seeds derived from G2 (foundation seeds) or higher classes and of the GB119 variety. These seeds are utilized to cultivate rice on their agricultural land. These superior seeds indicate that the farmers have adequately addressed the aspect of production risk mitigation concerning the selection of high-quality seeds.
3. **Fertilization:** Farmers undertake this process after applying the initial base fertilizer.
4. **Maintenance stage:** Farmers conduct maintenance activities after planting is completed. When the rice plants reach approximately 30 days of age, fertilization is carried out using Z.A. and Phonska fertilizers. Observations indicate that farmers' quantitative participation in the use of organic fertilizers remains relatively low, leading to the conclusion that farmers have a propensity to use inorganic fertilizers, which, in the long term, poses adverse risks to the quality of crop yields.

Farmers' behavior in environmental risk mitigation: Farmers' behavior in mitigating environmental risks is crucial for maintaining sustainable agricultural production and reducing negative environmental impacts. Several indicators, including the use of fertilizers and responses to weather or



climate changes, can be used to assess environmental risk mitigation.

1. **Fertilizer use:** Based on an interview with Mr. Zaid Karim, a farmer, the behavior of farmers in the use of fertilizers and pesticides is as follows:
“the fertilizers used by farmers are manure, Z.A. fertilizer, and Phonska. Urea fertilizer is not used because the nitrogen content in the soil in Salokaraja Village is considered quite high, so the use of urea is unnecessary. Weed control is managed with two types of pesticides: fungicides and herbicides. The fungicide used is Tanzeb, and the herbicide used is Gramoxone”
 Their use of fertilizers and pesticides can summarize the behavior of farmers in mitigating environmental risks. Fertilizers support the growth of rice plants. The fertilizers used by farmers include manure (originating from livestock waste), Z.A. fertilizer, and Phonska. Urea is not used because the nitrogen levels in the soil in the Salokaraja district are considered sufficiently high, rendering the use of urea unnecessary.
2. **Climate change:** Farmers' behavior in anticipating climate change can be observed through the effective management of water resources. This is crucial because the success of agricultural development is heavily influenced by the availability of water, a vital factor in production activities. This was demonstrated in an interview with Mr. Zaid Karim, one of the farmers:
“water management is conducted by rice farmers in the Salokaraja Subdistrict by irrigating the rice fields using a water source that is channeled through a tool called a sprinkler. This irrigation system distributes water through pressurized pipes via nozzles to the entire area of land to be irrigated. This method is flexible as it can also be used for fertilization and treatment, as well as maintaining soil moisture and controlling climate conditions suitable for plant growth”
 The efforts undertaken by farmers are undoubtedly influenced by the unpredictable weather conditions caused by climate change, such as global warming, climate anomalies, seasonal shifts, rainfall anomalies, and drought. The availability of water is crucial for the sustainability of agricultural endeavors, particularly rice cultivation. Therefore, efforts to mitigate the impacts of climate change should be focused on more than just the shoulders of farmers. Instead, cross-sectoral collaboration is essential, requiring contributions not only from the agricultural department but also from related stakeholders. It is also necessary to implement water management strategies that ensure water resilience, such as the utilization of reservoirs and dams and improvements to irrigation systems to anticipate the effects of drought.

Farmers' behavior in mitigating price risk: The occurrence of risk in the agricultural sector is caused by several factors,

including the instability and uncertainty of prices received and paid by farmers when purchasing inputs (Soedjana, 2007). The price changes in question relate to price levels and can influence farmers' expectations, government programs, and consumer demand. The price of rice is highly volatile and can fluctuate rapidly, depending on market demand and supply, environmental factors, and government policies. One of the factors affecting the price of rice is demand and supply. If the supply of rice exceeds demand, the price of rice will decrease. Conversely, if the demand for rice exceeds the supply, the price of rice will increase. Factors such as weather, natural disasters, and trade policies can also affect the price of rice.

1. **Price fluctuations:** particularly in the price of rice, can significantly affect farmers' income, especially for small-scale farmers who heavily rely on rice production as their primary source of livelihood. If the price of rice declines, farmers will receive lower income from their harvest. This situation can make it difficult for farmers to meet their basic needs. To mitigate price risk, farmers can adopt several risk mitigation strategies. An example of such a strategy is the use of production contracts, where farmers and rice buyers agree on a set price before the planting season begins. Additionally, farmers can monitor commodity markets to obtain information about future rice prices. Based on an interview with a source, Mr. Anto, a farmer, the following was found:
“the rice planting season starts in mid-February when the rains begin, and harvesting takes place in mid-May or early June, usually adjusted according to market rice prices. If the price in May is sufficiently high, the harvest will be carried out immediately, but if the price remains low, the harvest will be postponed to the following month”

Based on the statement, it is understood that farmers schedule their harvest during a specific time, namely in mid-May or early June, which is adjusted according to the prevailing market prices at that time. If the prices in May are sufficiently high, the harvest will proceed immediately. However, if the prices remain low, the harvest will be postponed to the following month. Despite the fact that, after harvest, farmers typically receive prices above the Production Cost Price (HPP), there are instances where the harvest prices fall below the HPP.

Institutional roles in Risk Mitigation

The role of the Department of Agriculture in risk mitigation: The Department of Agriculture plays a crucial role in risk mitigation within the agricultural sector. Risk mitigation involves efforts to reduce the impact of or eliminate risks and hazards in agricultural production. The Department of Agriculture can assist farmers in reducing risks by providing technical assistance, guidance, and financial support. Below



are some of the roles the Department of Agriculture plays in risk mitigation:

1. **Providing technical guidance:** The Department of Agriculture can offer technical guidance to farmers to enhance productivity and efficiency in agricultural production. The department collaborates with farmer groups to disseminate its programs.
2. **Assisting in the selection of superior varieties:** The Department of Agriculture is expected to help farmers select rice varieties that are more resistant to diseases and extreme weather. The department can collaborate with the Agricultural Research and Development Agency to apply research findings on superior varieties directly to farmers.
3. **Providing market information:** The Department of Agriculture can supply market information about the demand and price of rice. The department works with the Logistics Agency (B.U.L.O.G.) to continuously monitor market prices, ensuring that farmers' harvests can be absorbed.
4. **Assisting in environmental Risk Mitigation:** The Department of Agriculture can help farmers reduce environmental risks that may affect agricultural production, such as droughts or floods, by coordinating with the Meteorology and Geophysics Agency (B.M.K.G.) to monitor weather conditions, particularly rainfall. This coordination allows for proactive measures in anticipation of potential disasters like droughts or floods.

The role of agricultural extension workers in mitigating agricultural risks: Based on the research findings, agricultural extension workers play a crucial role in mitigating risks in the rice farming sector. Musliadi, as an extension worker with the PPK, has provided education and technical guidance by visiting farmers directly in their fields three days a week, informing them about training programs, and assisting farmers in combating pest infestations. These efforts help farmers reduce risks associated with agricultural production, thereby enhancing their welfare.

The role of financial institutions in mitigating agricultural risks: Financial institutions such as agricultural banks and cooperatives play a crucial role in providing savings and loan services for agricultural products and empowering farmers. These institutions, combined with government programs, offer financial support to farmers through schemes like the Agricultural People's Business Credit (K.U.R.) as part of corporate contributions to improving farmers' welfare. According to interviews conducted with supporting institutions, it was revealed that there currently needs to be financial institutions like cooperatives available in the area. A respondent noted that the nearest cooperative is located in Soppeng, which is quite far from the Salokaraja Village, resulting in a low number of residents seeking loans from the cooperative. Furthermore, most residents of Salokaraja

Village are highly self-reliant and do not heavily depend on institutions like cooperatives. Nevertheless, to assist farmers in further developing their agricultural businesses, the involvement of banking institutions is indispensable. Therefore, their presence must be supported by local government sectors to act as facilitators and coordinators (Zulkifli *et al.*, 2021).

The role of farmer groups in agricultural risk mitigation: The research findings indicate that the role of the Veteran, Tellang, Tobangko, and Sipurennu Lupangge farmer groups in Salokaraja Village is considered quite effective and plays an important role. These groups actively participate in activities organized by the Combined Farmer Groups (Gapoktan), such as field schools. These activities include guiding farmers in paddy soil testing to measure N.P.K. and soil pH levels, understanding plant soil requiem systems, pesticide introduction and calibration, identification of key pests and diseases in rice plants, first and second fertilization, commodity value chains of unhusked rice and milled rice, farm business analysis, harvesting and post-harvesting, as well as measuring plant height, number of tillers, plant spacing, pests and diseases, leaf number and length, and natural enemies. Furthermore, the farmer groups also collaborate with official distributors of government-subsidized fertilizers to provide facilities and infrastructure for rice farming production and offer capital through savings and loan contributions in partnership with financial institutions, both banking and non-banking.

Case studies

The role of institutions in agricultural risk mitigation: The role of institutions consists of the Department of Food Crops, Horticulture, Plantations, and Food Security, as well as agricultural extension agents, farmer groups, and cooperatives.

a) Role of the department of food crops, horticulture, plantations, and food security:

Table 1. Information on the head of the department of food crops, horticulture, plantations, and food security (TPH PKP).

Name	Information 1
Age	59 Tahun
Gender	Male
Education level	S2 Magister Management of Agribusiness
Main job	Civil servant
Title	Head of the Department of Food Crops, Horticulture, Plantations, and Food Security (TPH PKP)
Masa Kerja	32 years

Based on the interview with the Head of the Department of Food Crops, Horticulture, Plantations, and Food Security (T.P.H.P.K.P.):



- a. What is the condition of agriculture in Soppeng, specifically concerning the rice commodity?
"Rice is one of the main commodities developed by farmers in Soppeng Regency and it significantly supports the economy of Soppeng. The cultivation of rice is inseparable from the culture of the Soppeng community; even if it were prohibited, they would still plant Soppeng rice. Fortunately, from a production standpoint, there is an average increase every year, both due to the expansion of planting areas and due to increased productivity."
- b. What is the average harvest yield in Soppeng compared to the optimal harvest yield? How many tons per hectare?
The average harvest yield, according to the regency's data from the Central Statistics Agency (B.P.S.), is 5.9 tons per hectare. The target for this year was actually 6 tons, but this was not achieved due to several factors.
- c. How does the selling price of rice from farmers in Soppeng compare to the standard selling price? How many rupiahs per kilogram?
The selling price needs to be revised. The selling price in Soppeng Regency actually exceeds the government-set floor price (HPP), ranging from a minimum of Rp 4,400 to Rp 5,000, with an average of Rp 4,700. Under certain conditions, such as during the harvest in January, prices rise to Rp 5,200, but during the harvest in April, they fall to a low of Rp 4,200. Another issue is the deductions that occur. First, at the level of the collecting traders, there is a deduction of 5 kg, which farmers are forced to accept since nearly all collecting traders impose this deduction. Upon investigation, it was found that the reason for this deduction is that the significant traders also deducted 5 kg. Consequently, the ones who ultimately bear the risk are the farmers in Soppeng. This pertains to official deductions. Additionally, there are unofficial deductions, such as night weigh-ins, unethical traders, scales not being set to zero, or measurements being taken before the scale stabilizes. I have observed that the scales can measure up to a maximum of 105 kg per sack, whereas one large sack should ideally weigh at least 117 kg based on my field observations.
- d. What are the common risks encountered in rice farming? Pests, diseases, weather, lack of buyers, low prices?
"The primary risk from pests includes dominant pests such as rats and stem borers. The diseases most frequently occurring are stem rot and root rot, which affect crops along the shores of Lake Tempe. Tungro is the most feared disease. The weather in the past two years has been unpredictable. For example, the dry season should have occurred from September to October, but instead, there were floods due to erratic weather conditions. There is no issue with a lack of

buyers, as almost everyone is a consumer of rice. Prices may be considered low by farmers, but they have never fallen below the Production Cost Price (HPP)."

- e. What role does the Department of Agriculture play for farmers?
"The Department of Agriculture continuously monitors prices, whether they rise or fall."
- b) **The role of agricultural extension workers in risk mitigation:** The following is the resource person serving as an agricultural extension worker:

Table 2. Agricultural extension worker informant.

Name	Information 2
Jenis Kelamin	Male
Alamat	Salokaraja
Agama	Islam
Pekerjaan	PPK Extension Worker
Luas Lahan	1,2 Ha

Based on interviews conducted with the sources, responses were obtained regarding anticipatory measures for production risks, specifically related to pest control, as follows:

"anticipation of stem borers by mixing fertilizer with the pesticide type Furadan"

The agricultural extension officer also routinely conducts outreach to farmers three days a week, as evidenced by the services provided at the Agricultural Extension Center in Lalabata District, which include the following:

1. Agricultural production facilities, including fertilizers and pesticides
2. Agricultural machinery and tools (valsartan) and seeds
3. Agricultural technology consultation
4. Technical guidance through visits
5. Development of farmer groups or associations (Gapoktan)
6. Training
7. Dissemination of data and information
8. Assistance proposal
9. Verification and validation of subsidized fertilizer distribution

- c) **Role of farmer groups in risk mitigation:** The Veteran Farmer Group is one of the farmer groups located in Salokaraja Village, Lalabata District, Soppeng Regency, South Sulawesi Province. The total land area of the Veteran Farmer Group is 200 hectares. This group was established a long time ago by Mr. Ir. Arifuddin, a resident of Salokaraja Village, who was given the responsibility of serving as the head of the Veteran Farmer Group, and he is also the chairman of the Gapoktan. The group consists of 75 farmer members. Other farmer groups in the research area include Tellang, Tobangko, Sipurennu, and Lupange. The institutional role of the Self-Reliant Agricultural and Rural Training Center (P4S) is significant. This center is



an agricultural and rural training institution established, owned, and managed by farmers either individually or collectively. It is expected to play an active role in the development of agricultural and human resources through training and apprenticeships for farmers and the community in the region.

One of the efforts undertaken by the farmer groups is participating in the Field School program. The experiences of Mr. Lukman from the Telling 1 Farmer Group and H. Muh. Tang, the head of the Tobangko Farmer Group, includes the following:

- a. **Rice field soil test equipment (PUTS):** This equipment tests the levels of N.P.K. and soil pH to determine whether they are low, neutral, or high.
- b. **Soil and crop regimen system:** This involves seed breeding, where it is recommended to select seeds at a young age up until just before harvest.
- c. **Pesticide introduction and calibration:** The farmers are taught to identify pesticides and how to spray rice plants with the correct amount of liters per hectare. It is emphasized that we should avoid wastage due to excess and ineffectiveness (overdosing).
- d. **Identification of major pests and diseases in rice plants:** The farmers are educated about various pests and diseases, such as stem borers, rats, termites, and caterpillars, and how to control them. Diseases like blast disease and the control of disease "besek" in plants are also covered.
- e. **First and second fertilization:** Recommendations for fertilization are provided based on the results of the PUTS practices.
- f. **Value chain of paddy and rice commodities:** The farmers are taught how to sell paddy with a shorter supply chain, minimizing the use of intermediaries and selling directly to the factory.
- g. **Farm business analysis:** According to them, this is challenging as it requires calculating all expenditures and managing the farm business. After learning farm business analysis, they were able to understand their farming expenses and profits.
- h. **Harvesting and post-harvesting:** Farmers learn about yield estimation in the Field Laboratory (L.L.) and determining post-harvest processes. Before participating in the field school, the harvest yield was around 4 to 5 tons; after attending, it increased to 5 to 6 tons.
- i. **Exciting experience in observation:** This includes measuring plant height, counting tillers, plant spacing, pests, and diseases, counting and measuring leaf length, and identifying natural enemies. The planting systems used are legowo 2:1, legowo 4:1, and square planting. The highest yield from the test plot was achieved with the Legowo 4:1 system.

- d) **The Role of cooperative financial institutions in risk mitigation:** Based on interviews conducted with Mr. Arif, the leader of the Veteran Farmers Group in Salokaraja Village, Lalabata District, Soppeng Regency, it was found that:

"there are no financial institutions such as cooperatives. Mr. Arif stated that the cooperative is located in Soppeng, which results in fewer residents of Salokaraja Village borrowing from it. Additionally, the majority of the residents of Salokaraja Village are highly independent, so they do not heavily rely on institutions such as cooperatives and others"

The institutional factors present in Salokaraja Village, Lalabata District, Soppeng Regency, are pretty limited, and therefore, a cooperative specifically for agriculture still needs to be created. As a result, farmers are more self-reliant in meeting their agricultural needs, such as the provision of fertilizers and capital assistance.

DISCUSSION

1. **The role of the Department of food crops, horticulture, plantations, and food security (TPH PKP) in risk mitigation:** The Department of Food Crops, Horticulture, Plantations, and Food Security (TPH PKP), through the Ministry of Agriculture, collaborates synergistically with the Regional Development Planning Agency (B.A.P.P.E.D.A.) and agricultural services to develop mitigation and strategic planning for regions susceptible to flooding and drought. This synergy is essential to support mitigation measures against the impacts of climate change in the food crop sub-sector, thereby minimizing the risks associated with climate change impacts (Raditya and Azaria, 2024). Overall, the role of the TPH PKP in risk mitigation is quite adequate, including activities such as monitoring commodity selling prices and providing assistance to farmer groups. Furthermore, the empowerment of farmer groups is conducted through training and extension services, provision of seeds and fertilizers, and agricultural technology assistance under research conducted (Ali et al., 2014).
2. **The role of agricultural extension agents in risk mitigation:** The role of agricultural extension agents in integrated family-based agricultural corporate programs and the promotion of sustainable agriculture agendas has been quite positive. According to Irawan (2023) the contribution of agricultural extension agents in education and training demonstrates a positive gap analysis in three indicators: material relevance, support, and accessibility of extension services. The research findings indicate that agricultural extension agents play a critical role in risk mitigation within the rice farming sector. Musliadi, an extension agent with PPK, has



provided education and technical guidance by visiting farmers directly in their fields three days a week. This includes informing them about training programs and assisting farmers in managing pest attacks, thereby helping them reduce risks associated with agricultural production and improve their welfare. However, to further enhance the effectiveness of extension agents, several improvements are necessary. These include simplifying the extension materials and continuously updating them to remain relevant to the farmers' needs. Furthermore, the communication methods used in agricultural extension should integrate local wisdom with scientific knowledge to increase farmers' enthusiasm for learning and to enhance the local community's understanding of agricultural information delivery (Silaban *et al.*, 2024).

3. **Role of farmer groups in risk mitigation:** The existence of farmer groups is generally characterized by (1) non-independent groups, (2) low member participation, and (3) some groups lacking cohesion while others have dissolved but are still registered. Nonetheless, the role and function of farmer groups can be enhanced by fostering and developing the inherent strengths within these groups to motivate and encourage member behavior toward achieving the group's objectives. Therefore, efforts to strengthen the empowerment of farmer groups constitute a crucial strategic step in efforts to improve the welfare of farmers.
4. **Steps need to be taken:** The following steps that can be taken to strengthen farmer groups include encouraging and guiding farmers to collaborate economically as a group, fostering the development of farmer groups by improving access to capital for farmers, enhancing bargaining positions, providing guidance to group organizations, and increasing the efficiency and effectiveness of farming activities. Additionally, it involves enhancing the human resource capacity of farmers through various mentoring activities and training programs specifically designed for the leaders and members of farmer groups (Ramdhani *et al.*, 2015).
5. **The role of the farmer groups Veteran, Tellang, Tobangko, and Sipurennu Lupangge in the Salokaraja district:** Based on the research findings, the role of the farmer groups Veteran, Tellang, Tobangko, and Sipurennu Lupangge in the Salokaraja district is considered quite effective and plays a significant role. Among their contributions is participation in activities organized by the Farmers' Group Association (Gapoktan), such as field schools. In these activities, farmers receive guidance on various topics, including the Soil Testing of Rice Fields to assess N.P.K. and soil pH levels, soil regime systems for crops, pesticide introduction, and calibration, identification of significant pests and diseases affecting rice plants, first

and second fertilization, the value chain of grain and rice commodities, farm business analysis, harvest and post-harvest practices, as well as the measurement of plant height, number of tillers, plant spacing, pests and diseases, number and length of leaves, and natural predators. This aligns with research conducted by Yulida *et al.* (2013) which stated that the role of agricultural extension workers as educators, disseminators of information/innovation, facilitators, and consultants is considered very important by farmers.

6. **The role of financial institutions in agricultural risk mitigation:** In conclusion, the role of financial institutions in risk mitigation is crucial, particularly in mitigating financial risks. Through the provision of credit facilities and financing, insurance services, risk management services, market information dissemination, and the development of training and mentoring programs, banks can assist farmers in reducing financial and operational risks while enhancing the productivity and efficiency of their farming operations. Financial institutions such as agricultural banks and cooperatives, which offer savings and loan services for agricultural products as well as farmer empowerment initiatives alongside government programs that provide capital facilities to farmers in the form of People's Business Credit (Kredit *et al.*, K.U.R.) for agriculture, demonstrate a corporate contribution to the welfare of farmers. However, several challenges are encountered in practice, including financial policy constraints related to centralized and often complicated fund disbursement procedures (Ashari, 2009), which make it difficult for farmers to obtain loans. Furthermore, issues concerning collateral arise as farmers' assets often need to be more collateralizable and unbankable, which reduces their interest in utilizing banking services (Zulkifli *et al.*, 2021).
7. Based on interviews conducted with supporting institutions, it was found that there are no financial institutions like cooperatives currently available. The interviewee stated that the nearest cooperative is located in Soppeng, which is a considerable distance from the Salokaraja Sub-district. Consequently, the number of residents seeking loans from the cooperative is limited. Additionally, most residents of Salokaraja Sub-district are highly self-reliant and do not heavily depend on institutions such as cooperatives. Nevertheless, to assist farmers in further developing their agricultural businesses, support from banking institutions is indispensable. Therefore, the existence of such institutions must be backed by the local government sector as a supervisory and coordinative entity (Zulkifli *et al.*, 2021).



Conclusion: The role of the Department of Food Crop, Horticulture, Plantation, and Food Security, along with the selected farmer groups as research subjects, is crucial in the management of agricultural development. The Department of T.P.H.P.K.P. is responsible for managerial tasks, one of which is overseeing the fluctuations in post-harvest prices and ensuring effective pest control. The farmer groups serve as a platform for learning and cooperation, which are essential for farmers engaged in agricultural activities. The existing institutional framework comprises farmer groups, financing, education, and research institutions. However, the role of financial institutions, particularly agricultural cooperatives, still needs to be evident at the farmer's location, highlighting a gap in agricultural risk mitigation. Therefore, the government should promptly establish agricultural cooperatives to provide farmers with access to financial assistance, such as microcredit (K.U.R.), subsidized fertilizers, and agricultural equipment.

CRedit author statement: W.A.M.D. Malebbi conducted the research and prepared the initial draft. Mahyuddin and S. Kadir reviewed and finalized the draft.

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: We express our gratitude to Mahyuddin and S. Kadir for their guidance.

Funding: The authors did not receive support from any organization for the submitted work.

Ethical statement: This article does not contain any studies involving human participants or animals.

Availability of data and material: We declare that the submitted manuscript is our original work, which has not been published previously and is not currently under consideration for publication elsewhere.

Code availability: Not applicable.

Consent to participate: All authors participated in this research study.

Consent for publication: All authors submitted consent to publish this research. article in JGIAS.

SDGs addressed: Zero Hunger, No Poverty, Industry, Innovation, and Infrastructure.

Policy referred: Indonesian Agricultural Development Policy and the Agricultural Extension System Policy (Law No. 16 of 2006).

Publisher's note: All claims stated in this article are exclusively those of the authors and do not necessarily represent those of their affiliated organizations or those of *the publisher, the editors, and the reviewers. Any product that*

may be evaluated/assessed in this article or claimed by its manufacturer is not guaranteed or endorsed by the publisher/editors.

REFERENCES

- Ali, S., M. Idris and A. Parawangi. 2014. Peranan dinas pertanian dalam pemberdayaan kelompok tani di kecamatan manuju kabupaten gowa. Otoritas : Jurnal Ilmu Pemerintahan vol. 4.
- Raditya, M.R. and D.P. Azaria. 2024. Pemenuhan Hak Lingkungan bagi Masyarakat Tani yang Terdampak Perubahan Iklim Sesuai SDG di Indonesia. Jurnal Interpretasi Hukum 5:786-799.
- Ashari. 2009. Peran perbankan nasional dalam pembiayaan sektor pertanian di Indonesia. FORUM PENELITIAN AGRO EKONOMI 27:13-27.
- Irawan, N. 2023. Peran penyuluh dalam mengembangkan korporasi pertanian terpadu keluarga dan mempromosikan keberlanjutan melalui pendidikan, pelatihan, konsultasi, dan bimbingan. AGRIEKSTENSIA 22:14-27.
- Ramdhani, H., S.A. Nulhaqim and M. Fedryansyah. 2015. Peningkatan kesejahteraan petani dengan penguatan kelompok tani. Prosiding Penelitian Dan Pengabdian Kepada Masyarakat 2:301-444.
- Ruttan, V.W. and Y. Hayami. 1984. Toward a theory of induced institutional innovation. The Journal of Development Studies 20:203-223.
- Setyadi, F. 2017. Subjective well-being pada petani muda [skripsi]. Universitas Katolik Soegijapranata Semarang pp. 1-157.
- Silaban, D.I., Y. Rieng, M.R. Bataona, V. Menda and A. Bajo. 2024. Optimalisasi komunikasi penyuluhan pertanian dalam sekolah lapang iklim stasiun klimatologi kupang. WACANA: Jurnal Ilmiah Ilmu Komunikasi 23:121-131.
- Soedjana, T.D. 2007. Sistem usaha tani terintegrasi tanaman-ternak sebagai respons petani terhadap faktor risiko. Litbang Pertanian 26:82-87.
- Suharyanto, S., J. Rinaldy and N.A. Arya. 2015. Analisis risiko produksi usahatani padi sawah di provinsi bali. Journal of Agribusiness and Rural Development Research 1:70-77.
- Wadu, J., B. Nuswantara, K. Satya Wacana and R. Artikel. 2019. Strategi menghadapi risiko produksi padi sawah di kabupaten sumba timur. Jurnal Ekonomi Dan Bisnis 22:231-256.
- Butsi, F.I. 2019. Memahami pendekatan positivistik, konstruktivistik dan kritis dalam metode penelitian komunikasi. Jurnal Ilmiah Ilmu Komunikasi Communique 2:48-55.
- Yulida, R., Kausar and L. Marjelita. 2013. Dampak kegiatan penyuluhan terhadap perubahan perilaku petani sayuran



di kota pekanbaru. Indonesian Journal of Agricultural Economics 3:37-58.
Zulkifli, Z., S. Mardiyati, H. Hamzah, A. Idhan and S. Suhartina. 2021. Design innovative solution model for

banking specific financing in rice commodity agribusiness in south sulawesi. JURNAL GALUNG TROPIKA 10:379-390.

